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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/382,929	08/25/1999	PAUL A. FARRAR	303.603US1	5871
21186	7590	07/11/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			GRAYBILL, DAVID E	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/382,929

Applicant(s)

FARRAR, PAUL A.

Examiner

David E. Graybill

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-10,12,14,15,18-23,31-36,38-46 and 75-94 is/are pending in the application.
- 4a) Of the above claim(s) 15,18-23,31-36,38-46 and 75-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-10,12,14 and 94 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1 page.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 12 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 10 the scope of the language, "a non-structural component," is unclear because the terms "non-structural" and/or "component" appear to be given meanings repugnant to their usual meaning. To further clarify, the terms "non-structural" and "component" appear to be incompatible because, to further limit the product claim, the component is necessarily inherently structural. Indeed, in claim 14, the non-structural component is carbon, and carbon is inherently structural because it has an inherent structure. Further, the structure imparted to the component by the term "non-structural" cannot be determined.

In the rejections infra, generally, reference labels are recited only for the first recitation of identical claim elements.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C.

102(e) as being clearly anticipated by Eldridge (6667219)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

At column 3, lines 2-11; and column 7, lines 1-58, Eldridge discloses the following:

An integrated circuit assembly comprising: an electronic chip 52; and a conductive structure 55 embedded in a material layer 54, 58 inherently having a plurality of vaporization temperatures, the material layer is formed on the electronic chip and the conductive structure is coupled to the electronic chip; wherein at least one of the plurality of vaporization

temperatures (that of 58) is about 400 degrees centigrade; wherein the electronic chip inherently is a flip chip.

An integrated circuit assembly comprising: an electronic chip; and a conductive structure embedded in a plurality of materials 54, 58, each of the plurality of materials having a different vaporization temperature, the plurality of materials is formed on the electronic chip and the conductive structure is coupled to the electronic chip; wherein each of the plurality of materials contacts (at least indirectly physically) a surface of the electronic chip; wherein at least one 54 of the plurality of materials is silicon dioxide; wherein at least one 58 of the plurality of materials is carbon.

An integrated circuit assembly comprising: an electronic chip; and a conductive structure embedded in a material layer having a structural component 54 having a structural vaporization temperature and a non-structural component 58 having a non-structural vaporization temperature less than the structural vaporization temperature; wherein the structural component is fabricated from silicon dioxide; wherein the non-structural component is fabricated from carbon.

To further clarify, Eldridge discloses a chip 52 because Eldridge discloses both an integrated circuit 52, 53, and a small wafer of semiconductor material "semiconductive wafer" 52 that forms the base for

an integrated circuit 50, and a chip is defined as both an integrated circuit, and a small wafer of semiconductor material that forms the base for an integrated circuit. "chip." *Merriam-Webster Online Dictionary*. 2005.
<http://www.merriam-webster.com> (6 July 2005).

Furthermore, Eldridge inherently discloses a flip chip because the term "flip chip" is a statement of intended use of the chip that does not appear to result in a structural difference between the claimed chip and the chip of Eldridge. Further, because the chip of Eldridge appears to have the same structure as the claimed chip, it appears to be inherently capable of being used for the intended use, and the statement of intended use does not patentably distinguish the claimed chip from the chip of Eldridge. The manner in which a product operates is not germane to the issue of patentability of the product; *Ex parte Wikdahl* 10 USPQ 2d 1546, 1548 (BPAI 1989); *Ex parte McCullough* 7 USPQ 2d 1889, 1891 (BPAI 1988); *In re Finsterwalder* 168 USPQ 530 (CCPA 1971); *In re Casey* 152 USPQ 235, 238 (CCPA 1967). And, claims directed to product must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does [or is intended to do]." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Manning (5691565).

Eldridge does not appear to explicitly disclose wherein the electronic chip is a memory chip.

Still, as cited, Eldridge discloses wherein the electronic chip is integrated circuitry, and at column 1, lines 26-47, Manning discloses, "integrated circuitry such as memory circuitry." In addition, it would have been obvious to combine this disclosure of Manning with the disclosure of Eldridge because it would facilitate provision of the integrated circuitry of Eldridge and the memory circuitry of Manning.

Claims 1, 4, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Havemann (5461003).

Eldridge does not appear to explicitly disclose wherein the conductive structure is fabricated from copper.

Nevertheless, as cited, Eldridge discloses that the conductive structure is fabricated from metal. Moreover, at column 4, line 31 to column 5, line 27, Havemann discloses wherein the conductive metal structure 16 is fabricated from copper. Furthermore, it would have been obvious to combine this disclosure of Havemann with the disclosure of Eldridge because it would facilitate provision of the conductive metal structure of Eldridge.

Claims 1, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Akram (6214716).

Eldridge does not appear to explicitly disclose wherein the electronic chip is a flip chip.

Regardless, at column 1, lines 17-29; column 2, lines 48-67; and column 5, line 41-57, Akram discloses wherein an electronic chip is a "flip-chip." Moreover, it would have been obvious to combine this disclosure with the disclosure of Eldridge because it would facilitate external electrical connection of the substrate 52 of Eldridge.

Claims 1-6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun (6350672) and Murata (5268587).

At column 4, line 59, to column 7, line 44, Sun discloses the following:

An integrated circuit assembly comprising: an electronic substrate 60; and a conductive structure 66 embedded in a material layer 68, 70 inherently having a plurality of vaporization temperatures, the material layer is formed on the electronic substrate and the conductive structure is coupled to the electronic substrate; wherein at least one of the plurality of vaporization temperatures (that of 68) is about 400 degrees centigrade.

An integrated circuit assembly comprising: an electronic substrate; and a conductive structure embedded in a plurality of materials 68, 70, each of the plurality of materials having a different vaporization temperature, the plurality of materials is formed on the electronic substrate and the conductive structure is coupled to the electronic substrate; wherein each of the plurality of materials contacts (at least indirectly physically) a surface of the electronic chip; wherein at least one of the plurality of materials is silicon dioxide "silicon oxide"; wherein at least one of the plurality of materials is carbon.

An integrated circuit assembly comprising: an electronic substrate; and a conductive structure embedded in a material layer having a structural component 70 having a structural vaporization temperature and a non-structural component 68 having a non-structural vaporization temperature

less than the structural vaporization temperature; wherein the structural component is fabricated from silicon dioxide; wherein the non-structural component is fabricated from carbon.

However, Sun does not appear to explicitly disclose that the electronic substrate is a dynamic random access memory chip; wherein the conductive structure is fabricated from copper; wherein the electronic chip is a flip chip.

Nonetheless, at column 14, line 67 to column 15, line 5; and column 21, lines 1-6, Murata discloses that the electronic substrate 1 is a dynamic random access memory chip; wherein a conductive structure 57 is fabricated from copper; wherein the electronic chip is inherently a flip chip. Moreover, it would have been obvious to combine this disclosure of Murata with the disclosure of Sun because it would enable manufacture of a DRAM and reduce the migration phenomenon in the aluminum conductive structure of Sun.

Murata inherently discloses a flip chip because the term "flip chip" is a statement of intended use of the chip that does not appear to result in a structural difference between the claimed chip and the chip of Murata. Further, because the chip of Murata appears to have the same structure as the claimed chip, it appears to be inherently capable of being used for the intended use, and the statement of intended use does not patentably

distinguish the claimed chip from the chip of Murata. The manner in which a product operates is not germane to the issue of patentability of the product; Ex parte Wikdahl 10 USPQ 2d 1546, 1548 (BPAI 1989); Ex parte McCullough 7 USPQ 2d 1889, 1891 (BPAI 1988); In re Finsterwalder 168 USPQ 530 (CCPA 1971); In re Casey 152 USPQ 235, 238 (CCPA 1967). And, claims directed to product must be distinguished from the prior art in terms of structure rather than function. In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does [or is intended to do]." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

Also, in the alternative, although Sun does not appear to verbatim disclose silicon dioxide, as cited, Sun discloses that the structural component is silicon oxide. In addition, at column 19, lines 39-41; column 20, lines 36-45; and column 32, line 67 to column 33, line 3, Murata disclose that silicon oxide 70 is silicon dioxide and further discloses silicon dioxide structural components 36 and 54A. Furthermore, it would have been obvious to combine this disclosure of Murata with the disclosure of Sun because it would facilitate provision of the silicon oxide of Sun.

Claims 1, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juengling (6333556) and Eldridge (6667219).

At column 3, lines 11-55, Juengling discloses the following:

An integrated circuit assembly comprising: an electronic substrate "semiconductive substrate"; and a conductive structure 14b embedded in a material layer 30 having a plurality of vaporization temperatures, the material layer is formed on the electronic substrate and the conductive structure is coupled to the electronic substrate; wherein at least one of the plurality of vaporization temperatures is about 400 degrees centigrade.

An integrated circuit assembly comprising: an electronic substrate; and a conductive structure embedded in a plurality of materials 30, each of the plurality of materials having a different vaporization temperature, the plurality of materials is formed on the electronic substrate and the conductive structure is coupled to the electronic substrate; wherein at least one of the plurality of material is silicon dioxide; wherein at least one of the plurality of materials is carbon.

An integrated circuit assembly comprising: an electronic substrate; and a conductive structure embedded in a material layer having a structural component having a structural vaporization temperature and a non-

structural component having a non-structural vaporization temperature less than the structural vaporization temperature; wherein the structural component is fabricated from silicon dioxide; wherein the non-structural component is fabricated from carbon.

However, Juengling does not appear to explicitly disclose an electronic chip; wherein the electronic chip is a flip chip.

Nevertheless, as applied to claims 1, 5, 6, 8-10, 12, 14 and 94 supra, Eldridge discloses wherein the electronic substrate 52 is a flip chip. Furthermore, it would have been obvious to combine this disclosure of Eldridge with the disclosure of Juengling because it would facilitate provision of the electronic substrate of Juengling.

Claims 1, 2, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juengling and Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Manning (5691565).

Juengling and Eldridge do not appear to explicitly disclose wherein the electronic chip is a memory chip.

Still, as cited, Juengling discloses wherein the electronic substrate is an integrated circuit substrate having integrated circuitry 14b, and at column 1, lines 26-47, Manning discloses, "integrated circuitry such as memory

circuitry.” In addition, it would have been obvious to combine this disclosure of Manning with the disclosure of Juengling and Eldridge because it would facilitate provision of the memory circuitry of Manning.

Claims 1, 4, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juengling and Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Havemann (5461003).

Juengling and Eldridge do not appear to explicitly disclose wherein the conductive structure is fabricated from copper.

Nevertheless, at column 4, line 31 to column 5, line 27, Havemann discloses wherein the conductive structure 16 is fabricated from copper. Furthermore, it would have been obvious to combine this disclosure of Havemann with the disclosure of Juengling and Eldridge because it would facilitate provision of the conductive structure of Juengling and Eldridge.

Claims 1, 5, 6, 8-10, 12, 14 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge as applied to claims 1, 5, 6, 8-10, 12, 14 and 94, and further in combination with Akram (6214716).

Juengling and Eldridge do not appear to explicitly disclose wherein the electronic chip is a flip chip.

Regardless, at column 1, lines 17-29; column 2, lines 48-67; and column 5, line 41-57, Akram discloses wherein an electronic chip is a "flip-chip." Moreover, it would have been obvious to combine this disclosure with the disclosure of Juengling and Eldridge because it would facilitate external electrical connection of the electronic substrate of Juengling and Eldridge.

Applicant's amendment and remarks filed 4-22-5 have been fully considered, are addressed by the rejections *supra*, and are further addressed *infra*.

Applicant contends that the instant specification provides support for the claim term "a non-structural component."

The following is a quotation of MPEP 2111.01 [R-1]:

THE WORDS OF A CLAIM MUST BE GIVEN THEIR "PLAIN MEANING" UNLESS THEY ARE DEFINED IN THE SPECIFICATION

While the ** claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In *re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (discussed below)>; *MSM Investments Co. v. Carolwood Corp.*, 259 F.3d 1335, 1339-40, 59 USPQ2d 1856, 1859-60 (Fed. Cir. 2001). One must bear in mind that, especially in nonchemical cases, the words in a claim are generally not limited in their meaning by what is shown or disclosed in the specification. It is only when the specification provides definitions for terms appearing in the claims that the specification can be used in interpreting claim language. In *re Vogel*, 422 F.2d 438, 441, 164 USPQ 619, 622 (CCPA 1970).

This contention is respectfully traversed because the language "a non-structural component" is not clearly defined in the disclosure, and it otherwise has no plain meaning. To this end, MPEP 2114 instructs:

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART >While features of an apparatus may be recited either structurally or functionally,

claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); < In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

Therefore, by definition, the non-nonstructural limitation, "a non-structural component" cannot satisfy the requirement that apparatus [product] claims must be distinguished from the prior art in terms of structure.

Also, applicant's assumption that official notice is taken is incorrect.

Applicant further argues, "Sun does not appear to concern 'manufacture of a DRAM' or 'reduction of the migration phenomenon in aluminum conductive structure' or 'provision of the silicon oxide,' and so the statements in the Office Action are merely conclusory statements based on impermissible hindsight."

This argument is respectfully deemed unpersuasive and traversed because Sun is not relied on in the rejection for a disclosure of manufacture of a DRAM or reduction of the migration phenomenon in aluminum conductive structure. Furthermore, as elucidated in the rejection, Sun concerns provision of the silicon oxide.

Additionally, applicant asserts, "Sun reties [sic] two layers, a 'carbon layer' and an 'oxide layer' and therefore fails to teach or suggest a conductive structure embedded in a material layer as recited in claims 1 and 10."

This assertion is respectfully traversed because the alleged disclosure of two layers, a carbon layer and an oxide layer, would not be incompatible with the disclosure of Sun of "a conductive structure 66 embedded in a material layer 68, 70."

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

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advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

For information on the status of this application applicant should check PAIR:

Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (703) 872-9306.



David E. Graybill
Primary Examiner
Art Unit 2822

D.G.
7-Jul-05